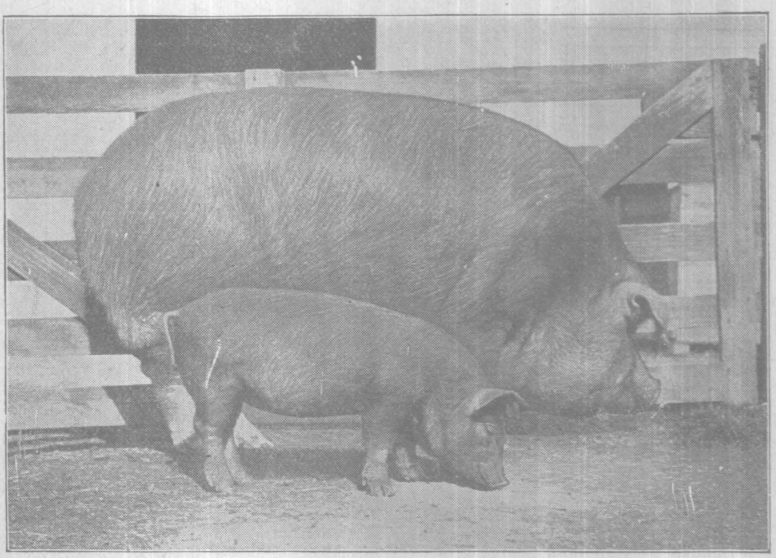
EFFECT OF AGE OF PIGS ON THE RATE AND ECONOMY OF GAINS

OHIO
Agricultural Experiment Station

WOOSTER, OHIO, U. S. A., MARCH, 1919

BULLETIN 335



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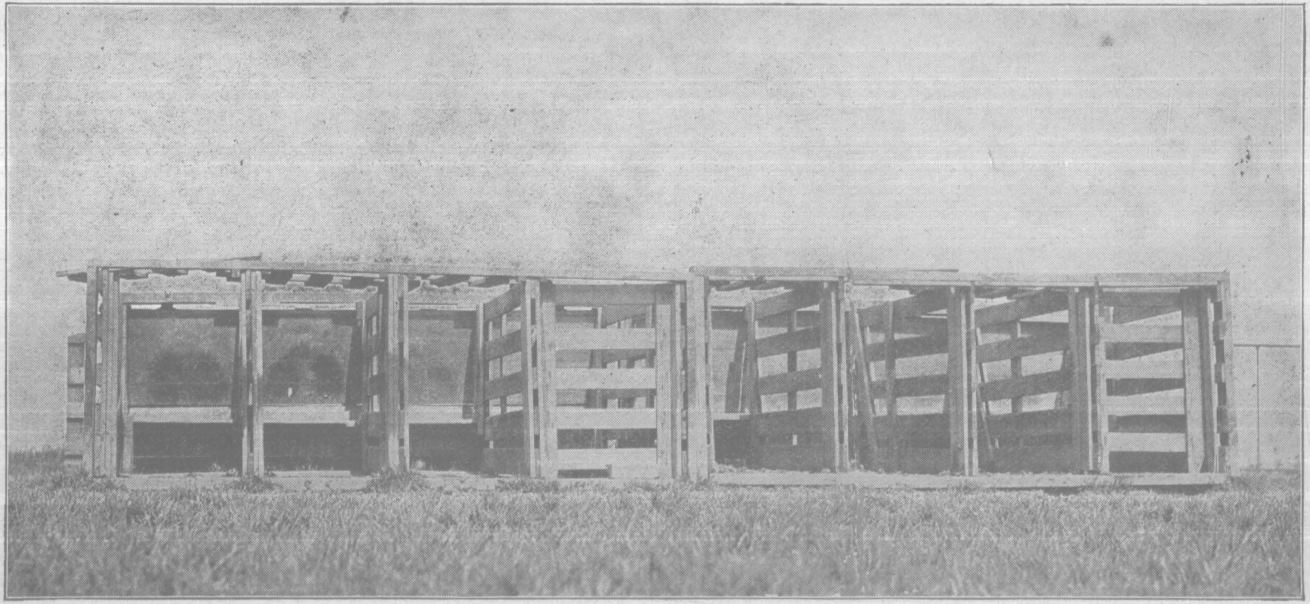

Type of crates used for individual feeding

BULLETIN
OF THE
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NUMBER 335 MARCH, 1919

EFFECT OF AGE OF PIGS ON THE RATE AND ECONOMY OF GAINS

W. L. ROBISON

The experiments herein reported were conducted to study the effect of age or weight of pigs, full-fed in dry lot, on the rate of gain, the amount of feed consumed per unit of increase in weight and the character of the gain produced, and to obtain information relative to the factors influencing the weight at which pigs that are full fed from birth should be slaughtered.

Pigs used.—Purebred Duroc-Jersey barrows from related dams were used. Those with the least possible difference in weight, age, thrift and uniformity were chosen for the experiments.

Quarters.—Until the individual feeding was started in the first two experiments, the pigs were housed in "A" houses and allowed to run on a small bluegrass plot. During the day their dams were turned out on a larger area of bluegrass. While fed individually the pigs were kept in two 10 by 12 feet pens of a central house having a concrete floor. Wooden overlays on which the pigs slept were provided during the winter. They were also allowed the run of a small dry lot in which the feed troughs were located. The quarters were cleaned daily. A small amount of straw was used for bedding.

Weighing.—The pigs were weighed weekly. Their first weights were taken the day after they were farrowed. When the individual feeding was started the weighing time was changed to the same day of the week for all the pigs. The weights were taken just after noon. Care was taken to have the conditions at the time of weighing as nearly normal as possible; on weight-taking days, water was withheld from 10 A. M. until after weighing.

Feeding.—The pigs were fed twice daily at regular hours. The amount fed was determined by what each pig would clean up readily without waste. All proportions were determined by weight. The

feeds were mixed dry. The daily feed for each pig was weighed out into morning and evening portions and just before feeding was mixed with sufficient water thoroughly to moisten it; during cold weather warm water was used. With the exception noted, drinking water was kept before the pigs at all times.

Feeds used.—The chemical composition of the feeds used in the first two experiments is given in Table I. The corn was ground before being fed. The composition of the linseed meal and skimmilk fed to some of the pigs before the individual feeding was begun is also given. In the first three experiments the pigs were allowed salt, finely ground rock phosphate, and ground limestone in separate containers.

TABLE I.—PERCENTAGE COMPOSITION OF FEEDS

	Water	Ash	Crude protein (N. x 6.25)	Carbohydrates		Fat (ether extract)
				Fiber	N-free extract	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground corn (Experiment I)	17.39	1.32	8.5	1.7	67.67	3.42
Tankage (Experiment I)	9.54	16.18	61.05	2.22	3.54	7.47
Middlings (Experiment I)	14.15	3.59	14.83	4.29	59 62	3.52
Linseed meal (Experiment I)	13 79	5.27	31 10	7.99	35.73	6.22
Ground corn (Experiment II)	16.62	1.15	8.31	2.09	68.52	3.31
Tankage (Experiment II)	9.15	17.15	59.81	4.24	1.23	8.42
Middlings (Experiment II)	11 70	3.71	14.66	4.69	60.80	4.44
Linseed meal (Experiment II)	10.20	5.61	31.56	8.20	36.84	7.59
Skimmilk (Experiment II)	90.63	.77	3.48	.....	5.02	.05

EXPERIMENT I

The pigs used in Experiment I were weaned at 8 weeks of age and were from 8 to 10 weeks old when they were first fed individually. They were placed on feed at 3 weeks of age or as soon as they would eat. Each litter was fed separately. During lactation the sows were fed individually. Three of the pigs and their dams received a ration of corn, linseed meal and tankage; the remaining seven and their dams were fed corn, middlings and tankage. From weaning until the individual feeding was started all the pigs received the latter ration and were fed together. In determining the feed per pig from farrowing to weaning the average of the total feed consumed by the sow and litter was used. Nothing was deducted or added for the maintenance of the sow or her loss or gain in weight during lactation. From the time of weaning until fed separately the average is taken as the daily feed per pig. Before they were weaned the pigs of the litter to which Pigs 125 and 127 belonged received an average of 21 pounds of skimmilk, 6 pounds of which were computed as equal to 1 pound of grain. All the pigs used were barrows.

Beginning with the evening feed of June 20, 1916, the pigs were fed individually. The ration used consisted of 10 parts of ground corn, 4 parts of middlings and 1 part of tankage by weight. Throughout the test each pig was given a full feed, what he would clean up readily, twice daily.

In Table II the results of the experiment are summarized by 100-pound intervals. The first weights were taken the day after the pigs were farrowed. The successive weights used were the weekly weights taken when each pig was nearest each 100-pound interval.

TABLE II.—EXPERIMENT I: EFFECT OF WEIGHT ON RATE AND ECONOMY OF GAINS

	From birth to 100 lbs. in weight	100 lbs. to 200 lbs. in weight	200 lbs. to 300 lbs. in weight	300 lbs. to 400 lbs. in weight	400 lbs. to 500 lbs. in weight
Number of pigs	10	8	6	4	2
Average number of days required	125	58.625	52.5	56	68
Average initial weight	2.69	101.375	200.667	302.5	401.5
Average final weight	100.75	199.3125	298.667	397.625	508.5
Total gain per pig	98.06	97.9375	98.	94.875	107.
Average daily gain	.784	1 671	1.867	1 694	1.574
Total feed per pig	283.391	377.219	436.375	476.25	571.
Daily feed per pig	2.267	6.434	8.312	8.460	8.397
Feed daily per 100 pounds weight*	4.337	4.280	3.348	2.428	1.846
Feed per pound gain	2.890	3.852	4.453	4.993	5.336

*Based on average of initial and final weights for period.

The original plan of the experiment was to kill two pigs at each 50-pound increase until a weight of 350 pounds was reached; consequently, fourteen pigs were started on the test. Two were killed at 50 pounds and two at 150 pounds after which it was decided to carry two to 500 pounds. None was killed at 250 or at 350 pounds. The ones that were to have been slaughtered at these weights were continued to the weights of 400 and 500 pounds. The records for the four pigs killed at 50 and 150 pounds are not included.

The table shows the number of pigs carried through each period, the average number of days required to produce each successive 100 pounds of gain, the average daily gain, the daily feed consumed per unit of live weight and the feed requirement per unit of gain. To determine the daily feed consumed per 100 pounds of live weight for each period the average daily feed per pig was divided by the average of the initial and final weights. Until a weight of 300 pounds was reached the rate of gain increased. For the last two 100-pound intervals it decreased. As the pigs became heavier they consumed less feed per unit of weight. The feed requirement per unit of gain increased for each successive interval.

To determine the dressing percentage and to study the character of the gains produced, two pigs were slaughtered at each 100-pound interval. Table III summarizes the results from birth, gives the average dressing percentage of the two killed and shows the number of pigs carried to each weight.

TABLE III.—EXPERIMENT I: EFFECT OF WEIGHT ON RATE AND ECONOMY OF GAINS FROM BIRTH

	From birth to 100 lbs. in weight	From birth to 200 lbs. in weight	From birth to 300 lbs. in weight	From birth to 400 lbs. in weight	From birth to 500 lbs. in weight
Number of pigs	10	8	6	4	2
Average number of days required	125	182.125	230.667	286.25	362
Average birth weight	2.69	2.7	2.75	2.525	2.8
Average final weight	100.75	199.312	298.667	397.625	508.5
Total gain per pig	98.06	196.612	295.917	394.85	505.7
Average daily gain	.784	1.080	1.283	1.379	1.397
Total feed per pig	283.391	667.047	1096.183	1570.137	2244.644
Daily feed per pig	2.267	3.630	4.752	5.485	6.201
Feed daily per 100 pounds weight	4.337	3.593	3.153	2.743	2.425
Feed per pound gain	2.890	3.362	3.704	3.977	4.439
Average dressing percent of two killed	76.3	81.5	84.5	86.9*	87.2

*See text below.

With the exception of the two 100-pound pigs, which were weighed without feed in the morning after having received a full feed the evening before, the dressing percentages are based on the live weights after fasting for 24 hours and the warm-dressed weights. The killing floor of the Station abattoir was not accessible at the time the two 400-pound pigs were killed. They were killed by a local butcher who skinned them instead of scalding them. The weights of the carcasses and hides with 5 pounds each deducted for hair, etc., were taken as their dressed weights. The differences in dressing percentages would make the 300-pound pigs 3.681 percent, the 400-pound ones 6.627 percent and the 500-pound ones 6.994 percent more valuable but would make the 100-pound pigs 6.38 percent less valuable per unit of live weight than were the 200-pound pigs. While the feed requirement per unit of gain in live weight increases with age the advantage of efficiency in favor of the pigs while young is not as great as would at first appear, for in proportion to their live weight, older pigs carry a larger amount of actual product (pork) than do younger pigs.

Table IV gives the individual record of each pig from birth until slaughtered. Pig 145 gained less rapidly from 200 to 300 pounds than from 100 to 200 pounds in weight and Pig 181 gained less rapidly from 300 to 400 pounds than from 400 to 500 pounds. With these exceptions the pigs made faster gains for each successive 100-pound interval until a weight of 300 pounds was reached, then gained slower each time for the last two intervals.

TABLE IV.—EXPERIMENT I: INDIVIDUAL RECORD OF EACH PIG UNTIL SLAUGHTERED

Pig number	Initial weight	Total gain	Average daily gain	Total feed	Feed per pound gain	Daily feed per 100 pounds live weight
			From birth to 100 pounds in weight			
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
125	2.6	95.9	.78	304.257	3.173	4.893
127	2.4	103.6	.842	276 507	2.669	4.148
133	2.8	101.2	.784	295.549	2.920	4.290
135	3.	91.5	.762	251.095	2.744	4 292
145	3.4	93.6	.836	246.705	2.636	4.388
147	2.1	101.9	.856	262.005	2.571	4.150
152	2.	100.5	.756	295.005	2.935	4.245
153	2.3	101 7	.726	314.978	3.097	4.315
178	3.3	90.7	.703	268.281	2.958	4.275
181	3.	100.	.820	319.531	3.195	4.942
Average	2.69	98.06	.784	283.391	2.890	4.337
			From 100 to 200 pounds in weight			
125	98.5	107.5	1.706	429.5	3.995	4.478
127	106.	89.	1.816	289.75	3.256	3.929
133	104.	102.	1.619	422.	4.137	4.322
135	94.5	101.5	1.812	360.	3.547	4.426
145	97.	106.5	1.521	429.75	4.035	4 086
147	104.	92.	1.643	342.	3.717	4.071
153	104.	80.5	1.643	297.	3.689	4.202
181	103.	104.5	1.659	447.75	4.285	4.578
Average	101.375	97.94	1.671	377.219	3.852	4.280
			From 200 to 300 pounds in weight			
125	206.	93.	1.898	417.5	4.489	3.374
127	195.	102.	2.082	407.25	3.993	3.379
135	196.	103.	1.839	470.	4.563	3.391
145	203.5	79.5	1.420	434.	5.459	3.186
147	196.	105.5	1.884	468.75	4 443	3.365
181	207.5	105.	2.143	420.75	4.007	3.303
Average	200.667	98.	1.867	436.375	4.453	3.329
			From 300 to 400 pounds in weight			
125	299.	102.	1.821	476.	4.667	2.429
127	297.	103.5	1.848	473.	4.570	2.422
147	301.5	84.5	1.724	414.	4.899	2.458
181	312.5	89.5	1.421	532.	5.944	2.364
Average	302.5	94.87	1.694	473.75	4.993	2.418
			From 400 to 500 pounds in weight			
125	401.	106.	1.413	628.5	5.929	1.846
181	402.	108.	1.770	513.5	4.755	1.846
Average	401.5	107.	1.574	571.	5.336	1.846

Pig 181 required less feed per unit of gain from 200 to 300 pounds than from 100 to 200 pounds in weight and less from 400 to 500 pounds than from 300 to 400 pounds. The others required more feed per unit of gain for each successive interval.

To shorten the time of the experiment as much as possible, until a weight of 400 pounds was reached, the poorest-gaining pigs were slaughtered each time. Table V compares for each interval the rate of gain and the feed requirement per unit of gain of the two pigs slaughtered and those of the pigs continued to the heavier weights. It also shows the average results for all the pigs that were carried through each period.

TABLE V.—EXPERIMENT I: COMPARISON OF GAINS AND FEED REQUIREMENTS OF PIGS SLAUGHTERED AND THOSE CONTINUED TO HEAVIER WEIGHTS

	Average daily gain				
	Birth to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
Of the two pigs killed	730	1.629	1.629	1.790	1.574
Of those not killed	.799	1.683	1.998	1.609	
Of 10 pigs carried to 100 pounds	.784				
Of 8 pigs carried to 200 pounds	.799	1.671			
Of 6 pigs carried to 300 pounds	.816	1.683	1.867		
Of 4 pigs carried to 400 pounds	824	1.701	1.998	1.694	
Of 2 pigs carried to 500 pounds	.800	1.683	2.020	1.609	1.574
	Feed per pound gain				
	Birth to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
Of the two pigs killed	2.946	3.940	4.953	4.718	5.336
Of those not killed	2.876	3.825	4.227	5.264	
Of 10 pigs carried to 100 pounds	2.890				
Of 8 pigs carried to 200 pounds	2.876	3.852			
Of 6 pigs carried to 300 pounds	2.831	3.825	4.453		
Of 4 pigs carried to 400 pounds	2.896	3.840	4.227	4.993	
Of 2 pigs carried to 500 pounds	3.184	4.138	4.234	5.264	5.336

Table VI gives the cost of feed per 100 pounds gain with the prices of feeds as shown in the table. Previous to weaning time three of the pigs received 39.938 pounds of linseed meal and two, 42 pounds of skimmilk. Ten pounds of the former were computed as equal in money value to 7 pounds of tankage, and 7½ pounds of skimmilk to 1 pound of tankage.

The cost of feed per unit of gain is influenced by the amount of feed required and the proportions and prices of the feeds used. The relative cost of feed per pound of gain from birth to the different weights and for the different intervals will depend upon these factors. Since the proportion of supplement was not changed from the time the individual feeding was started and since the feed requirement per unit of gain varied with the weight, the feed cost per unit of increase in live weight increased with each interval. However, the relative prices of corn and hogs are usually such that although more costly, the gains made at the heavier weights were not unprofitable.

TABLE VI.—EXPERIMENT I: COST OF FEED PER 100 POUNDS GAIN

Corn per bushel	Middlings per ton	Tankage per ton	Birth to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
		50	3.20	4.13	4.78	5.36	5.73
0.56	18	70	3.47	4.39	5.08	5.69	6.08
		90	3.74	4.65	5.37	6.02	6.44
		50	4.47	5 88	6.80	7.62	8.15
.84	27	70	4.74	6.14	7.09	7.96	8.50
		90	5.01	6.39	7.39	8.29	8.86
		50	5.73	7.63	8.82	9.89	10.56
1.12	36	70	6.00	7.88	9.11	10.22	10.92
		90	6.27	8.14	9.41	10.55	11.28
		50	7.00	9.37	10.83	12.15	12.98
1.40	45	70	7.27	9.63	11.13	12.48	13.34
		90	7.54	9.88	11.43	12.82	13.70
		50	8.27	11.12	12.85	14.41	15.40
1.68	54	70	8.53	11.37	13.15	14.75	15.76
		90	8.80	11.63	13.45	15.08	16.12
		50	9.53	12.86	14.87	16.68	17.82
1.96	63	70	9.80	13.12	15.17	17.01	18.18
		90	10.07	13.38	15.47	17.34	18.54
			Birth to 100 lbs.	Birth to 200 lbs.	Birth to 300 lbs.	Birth to 400 lbs.	Birth to 500 lbs.
			Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
		50	3.20	3.66	4.01	4.29	4.79
.56	18	70	3.47	3.92	4.28	4.58	5.10
		90	3.74	4.18	4.55	4.87	5.42
		50	4.47	5.16	5.67	6.09	6.79
.84	27	70	4.74	5.42	5.94	6.37	7.11
		90	5.01	5.67	6.21	6.66	7.42
		50	5.73	6.66	7.34	7.88	8.79
1.12	36	70	6.00	6.92	7.61	8.16	9.11
		90	6.27	7.19	7.88	8.45	9.42
		50	7.00	8.17	9.00	9.67	10.79
1.40	45	70	7.27	8.43	9.27	9.95	11.11
		90	7.54	8.69	9.55	10.24	11.42
		50	8.27	9.67	10.67	11.46	12.79
1.68	54	70	8.53	6.93	10.94	11.74	13.11
		90	8.80	10.19	11.21	12.03	13.42
		50	9.53	11.17	12.33	13.25	14.79
1.96	63	70	9.80	11.43	12.61	13.53	15.11
		90	10.07	11.69	12.88	13.82	15.42

If marketed at a weight of only 100 pounds a larger number of pigs would be needed to utilize a given amount of feed than if marketed at a heavier weight. When carried to 100, 200, 300, 400 and 500 pounds in weight, 11.00, 4.62, 2.77, 1.93 and 1.34 pigs, respectively, were needed to consume a ton of corn and the feed fed with it. In determining the cost of production this difference in initial cost should be added to the lower feed cost of the lighter pigs.

The ten pigs used in the experiment were farrowed by six sows, three of which raised litters 6 months earlier, two of which (50 and 54) were gilts and one of which (13) raised but the one

litter in 12 months. Table VII gives the feed consumed from the time the latter three were bred and from the time the preceding litters of the former three were weaned until farrowing. The table also shows the loss or gain in weight from this time until 1 week after farrowing, the weight of the sows when the pigs were weaned, their total loss or gain in weight and the number of pigs raised. The winter ration for No. 13 consisted of corn and alfalfa hay. The others received tankage in addition to corn and alfalfa. The hay was fed in racks. The soybeans were fed just prior to the time the sows were placed on winter feeding tests. The middlings and linseed meal were fed just previous to farrowing. During the winter the sows were fed experimentally in groups. For this time the average for the group is taken as the feed per sow.

TABLE VII.—EXPERIMENT I: FEED CHARGE PER PIG AT BIRTH

	Sow number						Total
	6	10	13	26	50	54	
Initial weight.....pounds..	410.	523.	357.	375.	259.	238.	2162.
Weight 1 week after farrowing...pounds.	409.	482.	373.	417.	327.	309.	2377.
Gain during period.....pounds..	59.	—41.	16.	42.	68.	71.	215.
Weight at weaning.....pounds..	436.	496.	381.	407.	300.	275.	2295.
Total gain.....pounds..	26.	—27.	24.	32.	41.	37.	133.
Number of days fed.....	117.	99.	114.	134.	113.	113.	690.
Feed consumed: corn.....pounds..	376.697	309.856	392.609	444.524	436.2	445.650	2405.536
tankage.....pounds .	39.805	34.428	4.488	47.807	48.467	49.517	224.512
alfalfa hay.....pounds..	253 071	260.071	305.892	267.571	6˜ 333	67.333	1221.271
ground soybeans.....pounds.	7.379	.....	3.631	8.399	.....	.....	19.409
middlings.....pounds..	.....	.....	.....	8.333	.....	.. ....	8.333
linseed meal.....pounds..	.....	.....	5.345	.....	.....	.....	5.345
Pigs raised to weaning.....	7.	5.	8.	9.	6.	9.	44.
Pigs on test.....	1.	2.	2.	3.	1.	1.	10.

The six sows raised a total of forty-four pigs. With corn at $1.12 per bushel and middlings at $36, alfalfa hay at $20, tankage at $75, and soybeans and linseed meal $52.50 per ton, their feed cost per pig previous to farrowing was $1.58.

Table VIII shows the value of the gains produced from a ton of corn and the middlings and tankage fed with it to the pigs, over the value of the feed, which also includes (as given in Table VII) the feed per pig consumed by their dams previous to farrowing. The middlings were computed as costing 90 percent as much per pound as the ground corn, the alfalfa one-half as much as the corn and the linseed meal and soybeans 70 percent as much as the tankage. The differences in the value of hogs per 100 pounds are based on the variation in the dressing percentages of the pigs of the different weights.

At the same price per 100 pounds the value of the gain over the feed cost varied inversely with the weight. With the difference in the price of hogs as given in the table when the relative prices of

hogs and feeds were normal the 200-pound pigs ordinarily showed the greatest return over the cost of feed. While the heavier pigs were usually not produced at a loss they were not as profitable as the lighter pigs.

TABLE VIII.—EXPERIMENT I: VALUE OF GAINS FROM A TON OF CORN AND THE FEED FED WITH IT OVER THE VALUE OF THE FEED*

Birth to	Value of hogs per cwt.	Corn per bu., 56 cts.		Corn per bu., $1.12		Corn per bu., $1.68	
		Tankage per ton					
		$50	$90	$50	$90	$50	$90
100 pounds	$ 6 55	$ 26.87	$ 19.83	$— 8 13	$—15.16	$—43.12	$—50.16
200 pounds	7.00	26.51	21 25	— 4.03	— 9.30	—34.58	—39.84
300 pounds	7.26	24.37	19.62	— 4.91	— 9.66	—34.19	—38.94
400 pounds	7.46	22.46	17.90	— 6.14	—10.70	—34.74	—39.30
500 pounds	7.49	17.13	12.70	—10.94	—15.37	—39.02	—43.44
100 pounds	$11.23	$ 77.39	$ 70.36	$ 42.40	$ 35.36	$ 7.40	$ .37
200 pounds	12.00	71.97	66.71	41.42	36.16	10.87	5.61
300 pounds	12.44	66.94	62.19	37.66	32.91	8.38	3.63
400 pounds	12.80	63.06	58.50	34.46	29.90	5.86	1.30
500 pounds	12.83	53.38	48.95	25.30	20.88	— 2.77	— 7.20
100 pounds	15.92	$127.89	$120.86	$ 92.90	$ 85.86	$ 57.91	$ 50.87
200 pounds	17.00	117.43	112.16	86.88	81.62	56.33	51 07
300 pounds	17.63	109.51	104.75	80.23	75.47	50.95	46.19
400 pounds	18.13	103.63	99.07	75.03	70.47	46.43	41.87
500 pounds	18.18	89.63	85.20	61 55	57.12	33.48	29.05

*In addition to the value of the ton of corn and the other feed fed with it the value of the feed includes, as shown by Table VII, the feed charge of the pigs at birth, with the price of linseed meal and ground soybeans seven-tenths that of tankage; alfalfa one-half that of corn and middlings nine-tenths that of corn.

EXPERIMENT II

Fall pigs were used in the second experiment. The individual feeding was started when they were from 11½ to 13 weeks of age. Until then the litters were fed separately. The pigs were placed on feed as soon as they would eat or when between 3 and 4 weeks of age, and were weaned at 8 weeks of age. Previous to the time the pigs were fed individually four of them received a ration of corn, 5 parts; middlings, 3 parts; tankage, 1 part: five a ration of corn, 8.6 parts; linseed meal, 2 parts; tankage, 1 part; and six a ration of corn, 1 part; skimmilk, 3.5 parts. During lactation the sows received the same rations and were fed separately. The average of the total feed consumed by the sow and litter is taken as the feed per pig from birth until fed individually. Nothing was deducted for the maintenance of the sow or her loss or gain in weight during lactation. All the pigs used were barrows.

Beginning with the evening feed of December 19, 1916, the pigs were fed individually and given a ration of 8 parts ground corn to 1 part of tankage. The corn was increased ¼ part weekly for

24 weeks after which the proportions remained constant. The pigs were fed what they would clean up readily twice daily without waste. To determine the dressing percentages and the character of gains produced, three pigs were killed at each 100-pound interval.

Table IX summarizes by 100-pound intervals the results secured, showing the number of pigs for each interval, the number of days per pig required to produce 100 pounds of gain, the average daily gain, the feed per pound gain, and the daily feed per 100 pounds weight. Skimmilk was fed to six of the pigs before the individual feeding was started. Six pounds of this was computed as equal to 1 pound of grain.

TABLE IX.—EXPERIMENT II: EFFECT OF WEIGHT ON THE RATE AND ECONOMY OF GAINS

	Birth to 100 lbs. in weight	100 to 200 lbs. in weight	200 to 300 lbs. in weight	300 to 400 lbs. in weight	400 to 500 lbs. in weight
Number of pigs	15.	12.	9.	6.	3.
Number of days required	146.2	56.	62.2	51.3	56.
Average initial weight....pounds..	2.55	99.46	200.	302.92	403.33
Average final weight....pounds..	98.96	200.04	301.89	400.67	503.67
Total gain per pig....pounds..	96.41	100 58	101.89	97.75	100.34
Average daily gain....pounds	.659	1.796	1.637	1.904	1.792
Total feed per pig....pounds .	325.927	348.708	436.056	408.896	472.917
Daily feed per pig....pounds	2.229	6.228	7.008	7.966	8.445
Feed daily per 100 lbs. weight.. pounds	4.392	4.159	2.793	2 264	1.862
Feed per pound gain....pounds..	3.381	3.467	4.280	4.183	4.713

Contrary to expectations based on Experiment I the pigs gained less rapidly from 200 to 300 pounds than from 100 to 200 pounds and their feed requirement per unit of gain for this period was higher than that for the succeeding period. During the week ending May 15 it was found necessary to reduce the feed slightly for all the pigs. The average daily gain per pig for the week was 1.18 pounds as compared with 1.78 pounds for the preceding week and 1.74 pounds for the following week. Pig number 76 went off feed on May 26 and was not back on full feed until June 13. For the week ending May 29 it gained only ½ pound. The average daily gain for the nine again dropped, this time to 1.16 pounds. The following week, however, the daily gain per pig was 1.8 pounds and with the exception of one pig on the test it was more nearly normal thereafter. During this time all the pigs were between 200 and 300 pounds in weight. On June 18, pig number 78 had a high temperature. It did not eat well from then until June 28. It was above 300 pounds in weight at the time. One of the three extra pigs fed with the lot went off feed on June 13 and died of pneumonia 3 days later. The indications are that all the pigs may have been

affected to some extent and this may offer at least a partial explanation of the relatively poor results for the period. No other abnormal conditions were experienced.

The rate of gain per unit of live weight decreased as the pigs became heavier.

Table X gives data regarding the rate of gain and feed consumption and utilization from birth to each 100-pound weight and shows the average dressed yield of the three killed. The dressing percentages are based on the live weights after fasting for 24 hours and the warm-dressed weights. The difference in dressing percentages would give the 100-pound pigs a value 7.361 percent lower than that of the 200-pound pigs and the 300-, 400- and 500-pound pigs values 3.557, 4.769 and 4.639 percent higher, respectively.

TABLE X.—EXPERIMENT II: EFFECT OF WEIGHT ON THE RATE AND ECONOMY OF GAINS FROM BIRTH

	Birth to 100 lbs. in weight	Birth to 200 lbs. in weight	Birth to 300 lbs. in weight	Birth to 400 lbs. in weight	Birth to 500 lbs. in weight
Number of pigs	15.	12.	9.	6.	3.
Number of days required	146.2	198.1	254.8	304.	356.
Average weight at birth	2.55	2.458	2.5	2.467	2.667
Average final weight	98.96	200.04	301.89	400 667	503.667
Total gain per pig	96.41	197.584	299.389	398.2	501.
Average daily gain	.659	.997	1 175	1.310	1.407
Total feed per pig	325.927	648.680	1062 057	1453.277	1901.851
Daily feed per pig	2.229	3.273	4.169	4.781	5.342
Feed daily per 100 pounds weight	4.329	3.234	2.739	2.372	2.108
Feed per pound gain	3.381	3 283	3.547	3.650	3.796
Average dressing percent of three killed*	79.035	85.315	88.350	89.384	89.273

*Based on fasted live weight and warm-dressed weight.

Table XI gives by 100-pound intervals the individual record of each pig from birth to the weight at which it was butchered. Ordinarily, as the pigs became heavier more pounds of feed were required to produce a pound of gain. One of the pigs killed at 400 pounds and one killed at 500 pounds gained more rapidly when between 300 and 400 pounds in weight than at any other time. All the others gained more rapidly while between 100 and 200 pounds in weight.

Table XII compares the rate of gain and the feed requirement per pound of gain of the three pigs for the 100-pound interval at the close of which they were slaughtered and of those for the pigs which were carried to heavier weights. It also shows for each successive 100-pounds gain the results yielded by all the pigs carried to a given weight.

TABLE XI.—EXPERIMENT II: INDIVIDUAL SUMMARY

No.	Initial weight	Total gain	Ave. daily gain	Feed			Feed per lb. gain			Daily feed per 100 lbs. live weight
				Corn	Tankage	Total	Corn	Tankage	Total	
From birth to 100 pounds in weight										
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
29	2.6	99.4	.747	.....	.....	227.845	.....	.....	2.292	3.276
33	2.1	93.9	.610	.....	.....	323.345	.....	.....	3.444	4.281
53	2.8	92.2	.552	.....	.....	376.967	.....	.....	4.089	4.616
64	2.0	98.0	.649	.....	.....	355.333	.....	.....	3.626	4.614
72	2.1	95.4	.701	.....	.....	289.398	.....	.....	3.034	4.273
76	2.4	92.6	.648	.....	.....	320.148	.....	.....	3.457	4.597
78	2.0	96.5	.710	.....	.....	284.148	.....	.....	2.945	4.158
85	2.9	98.1	.654	.....	.....	298.217	.....	.....	3.040	3.827
96	3 0	100.0	.676	.....	.....	320.811	.....	.....	3.208	4.090
99	3.1	94.4	.670	.....	.....	284.811	.....	.....	3.017	4.016
100	2.7	102.3	.726	.....	.....	283.311	.....	.....	2.769	3.731
109	2.8	95.2	.606	.....	.....	434.391	.....	.....	4.563	5.490
112	3.2	94.8	.578	.....	.....	478.891	.....	.....	5.052	5.771
119	2.3	93.7	.689	.....	.....	350.308	.....	.....	3.739	5.241
139	2.3	99.7	.733	.....	.....	260.986	.....	.....	2.618	3.680
Ave.	2.6	96.4	.659	.....	.....	325.927	.....	.....	3.381	4.505
From 100 to 200 pounds in weight										
29	102.	100.	1.786	289.083	27.667	316.75	2.891	.276	3.167	3.709
33	96.	108.	1.714	372.409	33.091	405.5	3.448	.307	3.755	4.291
64	100.	97.5	1.579	347.025	30.975	378.	3.488	.311	3.799	4.017
72	97.5	95.	1.857	313.889	29.361	343.25	3.018	.282	3.300	4.100
76	95.	98.5	2.010	280.018	25.982	306.	2.843	.264	3.107	4.329
78	98.5	101.5	1.812	308.143	28.857	337.	3.036	.284	3.320	4.032
85	101.	96.	1.524	356.937	31.813	388.75	3.718	.331	4.049	4.141
96	103.	103.	2.102	298.922	27.078	326.	2.902	.263	3.165	4.306
99	97.5	98.5	1.759	321.301	29.449	350.75	3.262	.299	3.561	4.268
100	105.	103.	1.839	334.855	30.645	365.5	3.251	.298	3.549	4.170
119	96.	105.	1.875	328.398	30.102	358.5	3.127	.287	3.414	4.311
139	102.	90.	1.837	282.315	26.185	308.5	3.137	.291	3.428	4.283
Ave.	99.5	100.6	1.796	319.441	29.267	348.7	3.176	.291	3.467	4.159
From 200 to 300 pounds in weight										
29	202.	98.	1.750	345.227	28.023	373.25	3.523	.286	3.809	2.655
72	201.5	99.5	1.777	394.81	31.315	426.125	3.968	.315	4.283	3.029
76	193.5	103.5	1.643	406.257	31.993	438.25	3.925	.309	4.234	2.835
78	200.	107.	1.698	393.988	31.012	425.	3.682	.290	3.972	2.661
96	206.	100.5	1.795	394.084	30.066	424.75	3.921	.305	4.226	2.960
99	196.	99.5	1.421	426.868	32.757	459.625	4.290	.329	4.619	2.672
100	208.	98.	1.556	425.97	32.780	458.75	4.347	.334	4.681	2.833
119	201.	98.	1.400	419.599	32.151	451.75	4.282	.328	4.610	2.581
139	192.	113.	1.794	432.935	34.065	467.	3.831	.302	4.133	2.983
Ave.	200.	101.9	1.637	404.415	31.640	436.056	3.969	.311	4.280	2.793
From 300 to 400 pounds in weight										
29	300.	94.5	1.687	391.371	28.129	419.5	4.141	.298	4.439	2.157
72	301.	97.	1.732	422.618	30.257	452.875	4.357	.312	4.669	2.314
76	297.	110.	2.619	346.967	24.783	371.75	3.154	.225	3.379	2.515
78	307.	85.	1.518	351.4	25.1	376.5	4.134	.295	4.429	1.924
96	306.5	102.	2.082	412.3	29.45	441.75	4.042	.289	4.331	2.522
100	306.	98.	2.00	364.933	26.067	391.	3.724	.266	3.990	2.248
Ave.	302.9	97.75	1.904	381.598	27.298	408.896	3.904	.279	4.183	2.264
From 400 to 500 pounds in weight										
29	394.5	111.5	1.593	504.933	36.067	541.	4.529	.323	4.852	1.717
76	407.	98.	2.333	370.767	26.483	397.25	3.783	.270	4.054	2.074
96	408.5	91.5	1.634	448.467	32.483	480.5	4.901	.350	5.251	1.889
Ave.	403.3	100.3	1.792	441.389	31.525	472.917	4.299	.314	4.713	1.862

TABLE XII.—EXPERIMENT II: COMPARISON OF GAINS AND FEED REQUIREMENTS OF PIGS SLAUGHTERED AND THOSE CONTINUED TO THE HEAVIER WEIGHTS

	Average daily gain				
	Birth to 100 lbs.	From 100 to 200 lbs.	From 200 to 300 lbs.	From 300 to 400 lbs.	From 400 to 500 lbs.
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Of the 3 pigs killed	.579	1.606	1.530	1.739	1.792
Of those not killed	.683	1.871	1.699	2.085	.....
Of 15 pigs carried to 100 pounds	.659	.....	.....	.....	.....
Of 12 pigs carried to 200 pounds	.683	1.796	.....	.....	.....
Of 9 pigs carried to 300 pounds	.699	1.871	1.637	.....	.....
Of 6 pigs carried to 400 pounds	.700	1.894	1.699	1.904	.....
Of 3 pigs carried to 500 pounds	.689	1.958	1.726	2.085	1.792
	Feed per pound gain				
	Birth to 100 lbs.	From 100 to 200 lbs.	From 200 to 300 lbs.	From 300 to 400 lbs.	From 400 to 500 lbs.
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Of the 3 pigs killed	4.567	3.866	4.439	4.358	4.713
Of those not killed	3.092	3.333	4.198	4.023	.....
Of 15 pigs carried to 100 pounds	3.381	.....	.....	.....	.....
Of 12 pigs carried to 200 pounds	3.092	3.467	.....	.....	.....
Of 9 pigs carried to 300 pounds	3.000	3.333	4.280	.....	.....
Of 6 pigs carried to 400 pounds	2.944	3.270	4.198	4.183	.....
Of 3 pigs carried to 500 pounds	2.975	3.147	4.094	4.023	4.713

Table XIII gives the cost of feed per 100 pounds gain with the varying prices of feed, as shown in the table. Middlings were computed at 90 percent the price of corn, linseed meal at 70 percent that of tankage and 7.5 pounds of skimmilk as having a money value equal to the price of 1 pound of tankage. By decreasing the proportion of high-priced supplement, for the first 24 weeks after the individual feeding was started, the cost of the mixture used was gradually reduced. Except when corn was high in price and the supplement cheap, the pigs made gains at a lower feed cost during the period when they were between 100 and 200 pounds in weight than during any other period. When the price of corn was 80 percent or more than 80 percent that of tankage the feed cost per pound of gain was lower for the period from birth to 100 pounds than for any other.

At any of the prices given, after a weight of 200 pounds was reached, the cost of feed per unit of gain was higher than it was for the interval from birth to 100 pounds. However, the difference in the assumed price of corn and tankage was sometimes sufficiently great to make the feed cost per unit of gain from birth higher when the pigs were carried to only 100 pounds than when carried to any of the heavier weights. The pigs while nursing were given rations which were comparatively rich in protein. It is

possible that this could have been widened and thus somewhat cheapened without materially affecting either the rate of gain or the feed requirement per unit of gain.

TABLE XIII.—EXPERIMENT II: COST OF FEED PER 100 POUNDS GAIN

Value of corn per bushel	Value of tankage per ton	Birth to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
.56	50	4 18	3.90	4 75	4 60	5.18
	70	4.71	4.19	5.06	4 88	5.50
	90	5 24	4.48	5 37	5.16	5 81
.84	50	5 60	5 49	6.73	6.55	7 38
	70	6.13	5.78	7.04	6 83	7.70
	90	6.66	6.07	7.35	7.11	8.01
1.12	50	7.03	7 08	8 71	8.51	9.58
	70	7.56	7 37	9.03	8 78	9.90
	90	8.09	7.66	9.34	9.06	10.21
1.40	50	8.46	8.67	10.70	10,46	11.78
	70	8 99	8.96	11 01	10 74	12.10
	90	9.52	9.25	11.32	11 02	12.41
1.68	50	9.89	10 25	12.68	12.41	13.98
	70	10 42	10.55	12.99	12.69	14.30
	90	10.95	10 84	13.31	12.97	14 61
1.96	50	11.32	11.84	14 67	14.36	16.18
	70	11.85	12.13	14.98	14 64	16.50
	90	12.37	12.42	15.29	14.92	16.81
		Birth to 100 lbs	Birth to 200 lbs.	Birth to 300 lbs.	Birth to 400 lbs.	Birth to 500 lbs.
		Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
.56	50	4.18	3 82	4.07	4.14	4.26
	70	4.71	4.20	4.43	4.48	4.58
	90	5.24	4.58	4.80	4.82	4.90
.84	50	5.60	5.25	5.64	5.78	5 99
	70	6.13	5 63	6 01	6 12	6.31
	90	6 66	6.01	6.38	6.46	6.63
1.12	50	7.03	6.68	7.22	7.43	7.72
	70	7.56	7.06	7.59	7.77	8.04
	90	8.09	7 44	7.95	8.11	8.37
1.40	50	8.46	8 11	8.80	9.07	9.45
	70	8 99	8 50	9.16	9.41	9 77
	90	9 52	8.88	9 53	9.75	10.10
1 68	50	9.89	9.55	10 37	10.71	11.18
	70	10 42	9 93	10.74	11.05	11.50
	90	10.95	10.31	11.11	11.39	11 83
1.96	50	11.32	10.98	11 95	12 36	12.91
	70	11.85	11.36	12.32	12.70	13.23
	90	12.37	11.74	12.68	13.04	13.56

Table XIV gives the value of the gains produced from 1 ton of corn and supplement fed with it to the pigs over the value of the feed, the feed charge including as given in Table VII, Experiment I, the sows' feed per pig previous to farrowing. When carried to 100, 200, 300, 400 and 500 pounds in weight the number of pigs needed to consume a ton of corn and the supplement fed with it was 7.26; 3.53; 2.12; 1.53 and 1.15, respectively. Based on the average rate

of gain of the pigs carried to the respective weights it would require 106, 70, 54, 46 and 41 days, respectively, for 10 pigs to consume this much feed. The difference in the price of hogs per 100 pounds is based on the variation in the dressing percentages of the pigs of the different weights, and does not take into account the larger proportion of fat and the smaller proportions of water and non-edible material in the carcass.

TABLE XIV.—EXPERIMENT II: VALUE OF GAINS FROM A TON OF CORN AND THE TANKAGE FED WITH IT OVER THE VALUE OF THE FEED*

Birth to	Value of hogs per cwt.	Corn 56c per bushel		Corn $1.12 per bushel		Corn $1.68 per bushel	
		Tankage per ton					
		$50	$90	$50	$90	$50	$90
100 pounds	$6.48	$10.18	$ 1.96	$—14.82	$—23.03	$—39.81	$—48.02
200 pounds	7.00	19.31	13.59	— 3.12	— 8.84	—25.55	—31 27
300 pounds	7 25	18.43	13 56	— 3 01	— 7.90	—24.48	—29.36
400 pounds	7.33	18.18	13.86	— 2.87	— 7 19	—23.92	—28.24
500 pounds	7.32	16.74	12.91	— 4.05	— 7.88	—24.84	—28.68
100 pounds	11.12	42.63	34.42	17.64	9.42	— 7.36	—15.57
200 pounds	12.00	54.22	48 51	31.80	26 08	9.37	3.65
300 pounds	12.43	51 27	46.40	29.82	24.94	8.36	3.49
400 pounds	12.57	50 05	45.73	29.00	24.68	7.95	3.63
500 pounds	12.56	46.98	43.15	26.19	22.36	5.40	1.56
100 pounds	15.75	75.08	66.87	50.09	41.87	25.10	16.88
200 pounds	17.00	89.15	83.43	66.72	61.00	44.29	38.57
3 0 pounds	17.60	84.12	79.24	62.66	57.79	41 21	36.33
400 pounds	17.81	81.92	77 61	60.87	56.56	39 82	35.51
500 pounds	17.79	77.22	73.39	56.43	52.59	35.64	31.80

* In addition to the value of the ton of corn and the supplement fed with it the value of the feed includes, as shown by Table VII, the feed charge of the pigs at birth

At the prices of feeds and hogs as given in the table, with one exception, the pigs returned a greater margin over the feed cost at 200 pounds than at any other weight. At the same value per 100 pounds the returns in favor of the 200-pound pigs were still greater.

Unless the relative prices of feed and hogs were unusual, the pigs were carried to a weight of at least 400 pounds at a profit. Since this is true if the hog supply is limited a greater aggregate profit might sometimes be made by carrying pigs to a heavier weight than the weight at which the greatest profit would be secured if a sufficient number of pigs were raised to consume the supply of corn by the time that weight was reached.

Determined from the value of the gains over the value of the feed as given in Table XIV, Table XV shows the prices at which the pigs of the different weights should have sold for the gains produced from 1 ton of corn and the tankage fed with it to give returns over the cost of feed equal to those given by the 200-pound pigs. The

latter were valued at $7, $12 and $17 a hundredweight. In addition to the cost of 1 ton of corn and the tankage fed with it to the pigs, the cost of feed includes the feed charge per pig at birth as given in Table VII. With hogs priced at the lower values and the price of corn at $1.12 and $1.68 per bushel, the value of the feed consumed was greater than the value of the gains produced.

TABLE XV.—EXPERIMENT II: PRICES AT WHICH HOGS SHOULD SELL FOR THE GAINS PRODUCED FROM A TON OF CORN AND THE TANKAGE FED WITH IT TO GIVE THE SAME RETURN OVER THE COST OF FEED AS 200-POUND HOGS AT THE ASSUMED PRICES

Birth to	Corn 56c per bushel		Corn $1.12 per bushel		Corn $1.68 per bushel	
	Tankage per ton					
	$50	$90	$50	$90	$50	$90
100 pounds	$7.79	$8.14	$8.15	$8.51	$8.52	$8.88
200 pounds	7.00	7.00	7.00	7.00	7.00	7.00
300 pounds	7.39	7.25	7 23	7.10	7 08	6.95
400 pounds	7.52	7.29	7.29	7.06	7.07	6.84
500 pounds	7.77	7.44	7.49	7.16	7.20	6.88
100 pounds	12.77	13.13	13.14	13.49	13 50	13.86
200 pounds	12.00	12.00	12.00	12.00	12.00	12.00
300 pounds	12.89	12 76	12.74	12.61	12.59	12.45
400 pounds	13.26	13.03	13.03	12.80	12.81	12 58
500 pounds	13.81	13.48	13.53	13.20	13.24	12.92
100 pounds	17.76	18.11	18.12	18.48	18.49	18.84
200 pounds	17.00	17.00	17.00	17.00	17.00	17.00
300 pounds	18.40	18.26	18 24	18.11	18.09	17 96
400 pounds	19.00	18.77	18.77	18.54	18.55	18.31
500 pounds	19.85	19.53	19.57	19.24	19.29	18.96

EXPERIMENT III

Fall pigs farrowed in 1917 were used in the third experiment. Only barrows were used in the test and care was taken to select representative pigs from the herd. They were fed individually until December 7, when they were from 11 to 13 weeks of age. From the time they were 3 to 4 weeks of age until the individual feeding was started they were fed rations composed of hominy feed, middlings, tankage and skimmilk. Before weaning they were fed in three groups. The sows, during lactation, received a ration of hominy feed, 7 parts; middlings, 2 parts, and tankage, 1 part. The average for all the pigs is taken as the feed per pig for those used on the test previous to the time they were fed individually. The feed charge per pig of the sows during lactation is included in the determination of the feed requirement per unit of gain from birth to 100 pounds. Nothing is allowed for the maintenance of the sow or her loss or gain in weight during lactation. Some of the sows were fed separately and some in groups. Six pounds of skimmilk were computed as equal to 1 pound of grain.

After the individual feeding was started the ration fed was the same as that used in Experiment II. For the first week 8 pounds of corn to 1 of tankage was fed. The corn was then increased ¼ part weekly for 24 weeks after which the constant proportion of 14 pounds of corn to 1 of tankage was fed. The pigs were given what they would clean up readily twice daily without waste.

Because of the severity of the weather the pigs were kept in a basement barn floored with concrete and fed inside from January 11 to March 22. The remainder of the time they were kept in the same quarters as were used in Experiments I and II, where the feed troughs were located outside.

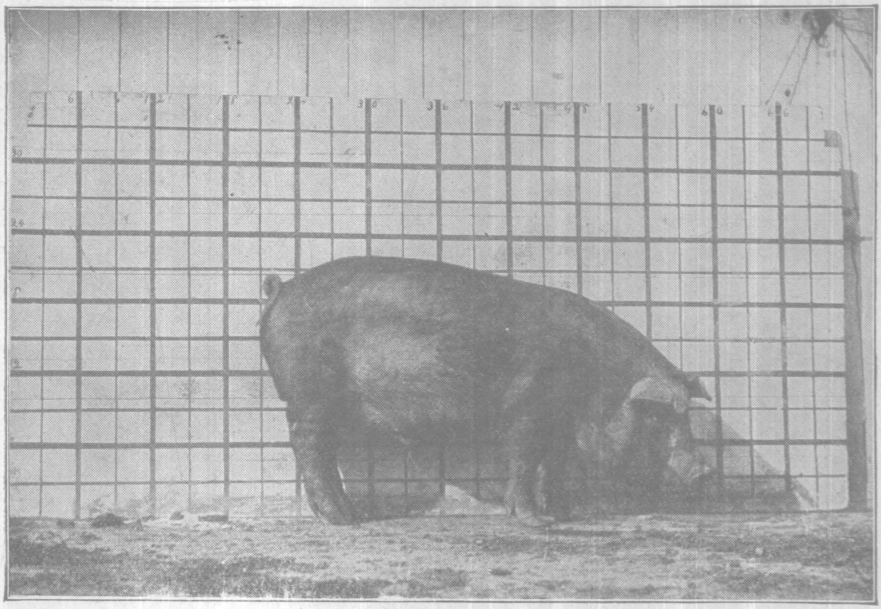
Table XVI summarizes the results secured, giving the number of pigs fed, the average number of days required, the daily gain per pig, the feed consumed daily per 100 pounds and the feed requirement per unit of gain for each interval. The dressing percentages of the two pigs killed at the close of each 100-pound interval are also shown.

TABLE XVI.—EXPERIMENT III: EFFECT OF WEIGHT ON THE RATE AND ECONOMY OF GAINS

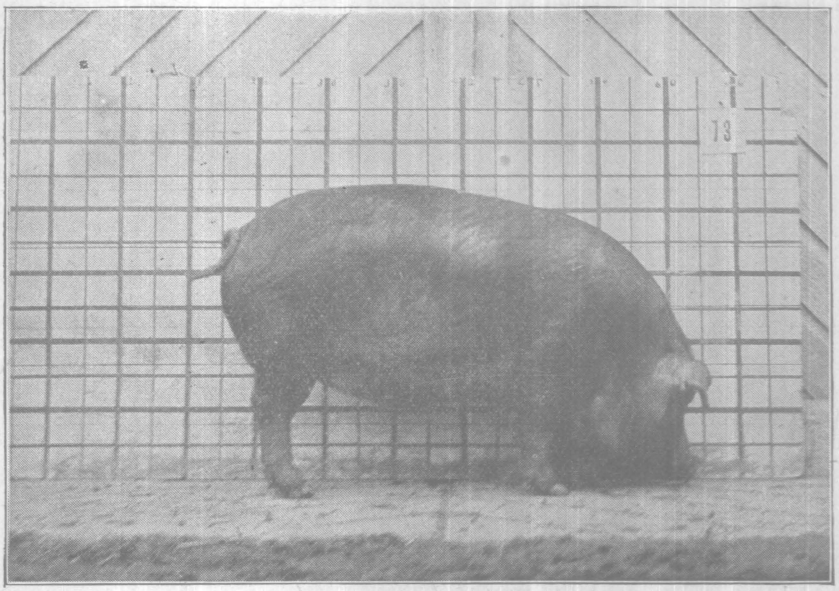
	Birth to 100 lbs. in weight	100 to 200 lbs. in weight	200 to 300 lbs. in weight	300 to 400 lbs. in weight	400 to 500 lbs. in weight
Number of pigs	12	10	8	6	2
Averawe number of days required	140.8	63	48.125	64.5	73.5
Initial weight per pig....pounds	2.717	100.35	203.937	299.083	401.25
Final weight per pig....pounds	101.167	203.6	299.250	398.083	501.75
Total gain per pig....pounds	98.450	103.25	95.313	99.000	100.50
Average daily gain....pounds	.999	1.639	1.981	1.535	1.367
Feed per pig: corn....pounds	.....	326.685	329.045	455.064	493.15
tankage....pounds	.....	29.178	24.924	32.528	35.225
total....pounds	280.903	355.863	353.969	487.592	528.375
Daily feed per pig....pounds	1.995	5.649	7.355	7 560	7.189
Feed daily per 100 lbs. weight....pounds	3.896	3.717	2.923	2.169	1.592
Feed per pound gain: corn....pounds	.....	3.164	3.452	4.597	4.907
tankage....pounds	.....	.283	.262	.328	.350
total....pounds	2.853	3.447	3.714	4.925	5.257
Two killed at final weights dressed*..percent	75.257	80.463	83.93	86.506	86.616

*See text below.

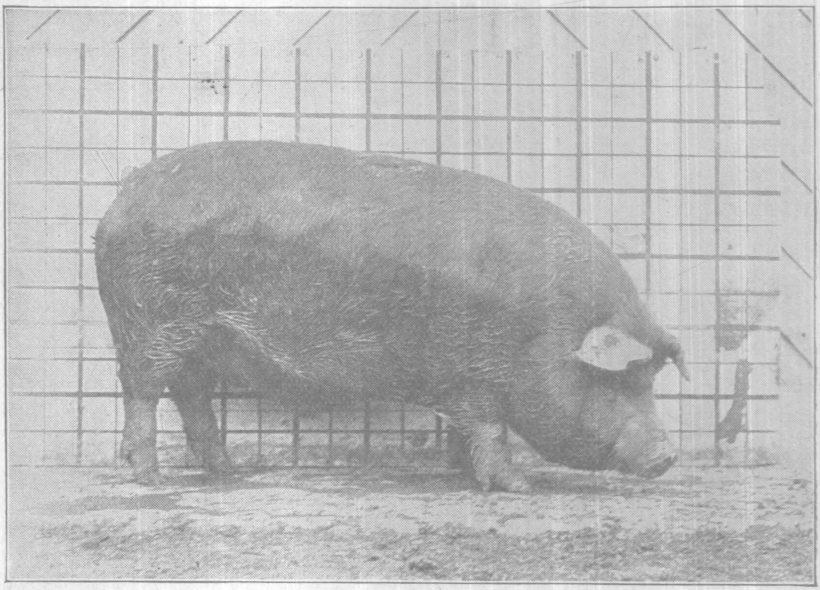
The pigs gained more rapidly each period until a weight of 300 pounds was reached. From 300 to 400 pounds with one exception each of the six pigs then on the test gained more slowly than it had while between 200 and 300 pounds in weight. The daily feed consumption per unit of weight decreased for each successive interval. As the pigs became heavier their feed requirement per unit of gain increased. The dressed yields as shown in the table are based on the live weights after the pigs were fasted for 30 hours and the dressed weights of the carcasses after cooling for 48 hours.



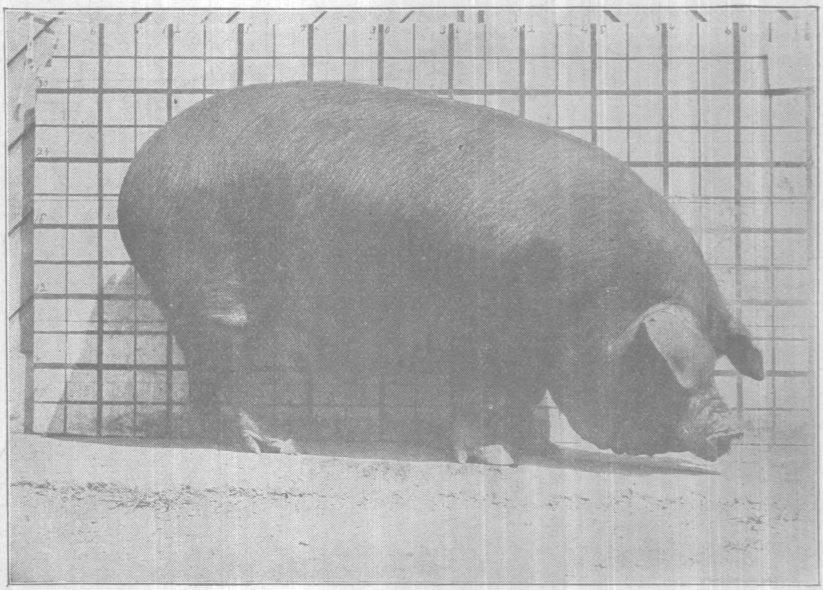
Representative 100-pound pig



Representative 200-pound pig

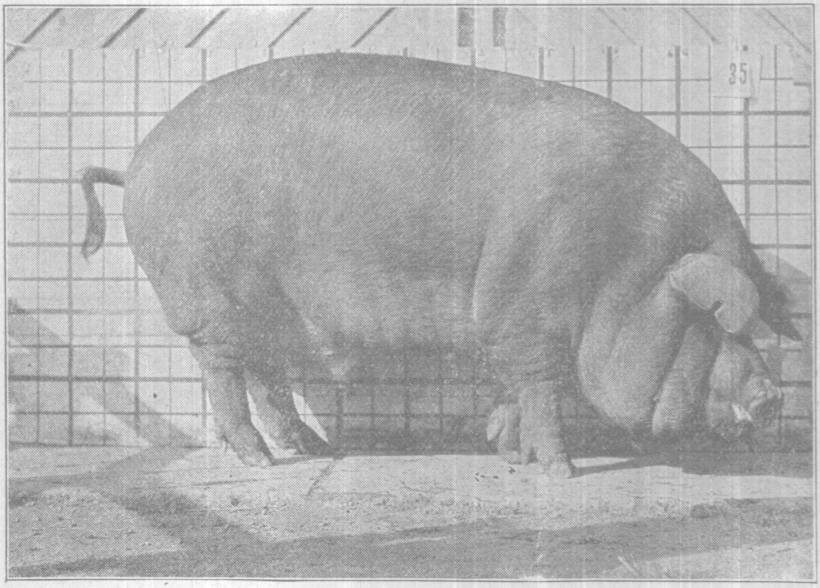


Representative 300-pound pig



Representative 400-pound pig

Table XVII gives the individual record of each pig from the time of its weight taken when nearest 50 pounds. From 50 to 100 pounds in weight Pig 38 consumed more feed per unit of gain than from 100 to 200 pounds in weight. Pigs 56, 73 and 78 required no more feed per unit of gain for the 100 to 200-pound interval than for the 50 to 100-pound interval. The feed requirement per unit of gain for Pig 69 was high for the 100- to 200-pound interval and low for the 200 to 300-pound interval. Pig 78 did exceptionally well while between 300 and 400 pounds in weight requiring less feed per pound of gain for this period than for the preceding one. With these exceptions the feed consumed per unit of gain varied directly with the weight of the pigs.



Representative 500-pound pig

Without exception the rate of gain increased as the pigs became heavier until a weight of 300 pounds was reached and one pig only (78) gained more rapidly from 300 to 400 than from 200 to 300 pounds in weight.

Although it maintained a good appetite, during the latter part of the 300 to 400-pound period Pig 8 failed to respond normally. From May 24 to July 19 it gained at the rate of 1.22 pounds daily and consumed 607.85 pounds of feed per 100 pounds of gain. From the latter date until August 19 it gained only .45 pound daily with a feed consumption of 1,556.25 pounds for each 100 pounds of gain produced.

TABLE XVII.—EXPERIMENT III: INDIVIDUAL SUMMARY

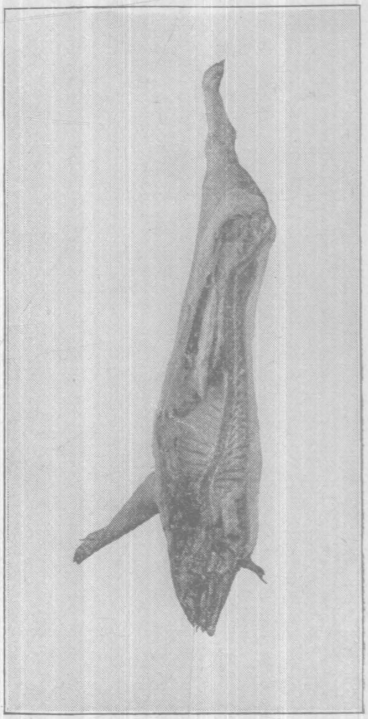
Pig No.	Initial weight	Final weight	Total gain	Average daily gain	Feed			Feed per 100 lbs. gain			Average daily feed	Feed daily per 100 lbs. weight
					Corn	Tankage	Total	Corn	Tankage	Total		
From 50 to 100 pounds in weight												
	Ponnds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pcunds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
5	55.0	105.5	50.5	0.802	153 665	16.835	170.500	304.287	33.337	337.624	2.706	3.372
8	54.0	98.5	44.5	.908	105.420	11.955	117.375	236.899	26.865	263.764	2.395	3.142
35	51.0	102.0	51 0	.911	127.414	14.211	141 625	249.831	27 865	277.696	2.529	3.306
38	58.5	96 0	37.5	.670	177.633	19.117	196.750	473.688	50.979	524.667	3.513	4.548
45	53.0	95.5	42.5	1.012	112.122	11.878	124 000	263.817	27.948	291.765	2.952	3.976
56	51.0	104.0	53 0	.946	162.207	17.043	179.250	306.051	32.157	338.208	3 201	4.130
69	50.0	109.0	59.0	1.054	133 393	14.482	147.875	226 090	24 546	250.636	2.641	3 322
70	48.0	105.0	57.0	.905	150.048	16.452	166.500	263.242	28.863	292.105	2.643	3.455
72	49.0	98.5	49.5	.884	122.897	13.728	136.625	248.277	27 733	276 010	2.440	3.308
73	54 0	104.0	50.0	.794	147.100	16.150	163.250	294.200	32.300	326 500	2 591	3.280
78	49 5	96.0	46.5	.830	153.369	16.131	169.500	329.826	34.690	364.516	3 027	4.161
111	48.0	100.0	52.0	.929	125.720	14.030	139.750	241.769	26 981	268.750	2.496	3.372
Average	51.75	101.167	49.417	.882	139.249	15.168	154.417	281.786	30.693	312.478	2.757	3.606
From 100 to 200 pounds in weight												
8	98.5	200.0	101 5	1 611	299.423	27.702	327.125	294.998	27.293	322.291	5.192	3.479
35	102.0	210.0	108.0	1.714	313.209	28.416	341.625	290.008	26 311	316.319	5 423	3.476
38	96 0	202.0	106.0	1.377	374.586	33.164	407.750	353.383	31.287	384.670	5 295	3.554
45	95.5	195.0	99.5	1.777	318.443	28.557	347.000	320.043	28 701	348 744	6 196	4.266
56	104.0	210.0	106.0	1.683	328.978	28.522	357.500	310.357	26.907	337.264	5.675	3.614
69	109.0	202.0	93.0	1.476	320.275	28.475	348.750	344 382	30.618	375.000	5.536	3.560
72	98.5	206.5	108.0	1.714	335.024	30.351	365.375	310.207	28.103	338 310	5.800	3.803
73	104.0	207.0	103.0	1.839	308.319	27.681	336.000	299.339	26 875	326.214	6.000	3.859
78	96.0	206.0	110.0	1.746	368.606	31.644	400.250	335 097	28 767	363.864	6 353	4.207
111	100.0	197.5	97.5	1.548	299.984	27 266	327.250	307.673	27.965	335 641	5.194	3.492
Average	100.35	203.6	103.25	1.639	326.685	29.178	355.863	316.401	28.259	344.660	5.649	3.717

TABLE XVII.—EXPERIMENT III: INDIVIDUAL SUMMARY—Concluded

Pig No.	Initial weight	Final weight	Total gain	Average daily gain	Feed			Feed per 100 pounds gain			Average daily feed	Feed daily per 100 lbs. weight
					Corn	Tankage	Total	Corn	Tankage	Total		
From 200 to 300 pounds in weight												
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Ponnds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
8	200.0	301.5	101.5	1.812	361.136	27.964	389.100	355.799	27.551	383.350	6.948	2.771
35	210.0	296.0	86.0	2.048	269.086	20.839	289.925	312.891	24.231	337.122	6.903	2.728
38	202.0	290.5	95.5	1.705	392.466	29.009	421 475	410.959	30.376	441.335	7.526	3.014
45	195.0	299.0	104.0	2.122	353.153	27.097	380.250	339.570	26.055	365.625	7.760	3.142
56	210.0	303.5	93.5	1.908	339.538	25.212	364.750	363.142	26.965	390.107	7.444	2.899
69	202.0	300.5	98.5	2.345	289.496	22.004	311 500	293.905	22.339	316.244	7.417	2.952
72	206.5	298.0	91.5	2.179	299.077	23.173	322.250	326.860	25.326	352.186	7.673	3.042
78	206.0	298.0	92.0	1.878	328.406	24.094	352.500	356.963	26.189	383.152	7.194	2.855
Average	203.938	299.250	95.312	1.981	329.045	24.921	353.969	345.227	26.150	371.377	7.355	2.923
From 300 to 400 pounds in weight												
8	301.5	384.0	82.5	.949	591.967	42 283	634.250	717.536	51.252	768.788	7.290	2.127
35	296.0	404.0	108.8	1.929	401.550	28.750	430.300	371.806	26.620	398.426	7.684	2 195
38	297.5	396.0	98.5	1.428	476.117	34.008	510.125	483.367	34.526	517.893	7 393	2.132
56	303.5	401.0	97.5	1.741	411.483	29.392	440.875	422.034	30.146	452.180	7.873	2.235
72	298.0	398.5	100.5	1.595	477.450	34.175	511.625	475.075	34.005	509.080	8.121	2.332
78	298.0	405.0	107.0	1.911	371.817	26.558	398.375	347.492	24.821	372.313	7.114	2.024
Average	299.083	398.083	99.0	1.535	455.064	32.528	487 592	459.661	32.856	492.517	7.560	2.169
From 400 to 500 pounds in weight												
35	404.0	503.5	99.5	1.292	511.933	36.567	548.5	514.506	36.750	551.256	7 123	1.570
72	398.5	500.0	101.5	1.450	474.367	33.883	508.25	467.357	33.382	500.739	7.261	1.616
Average	401.25	501.75	100.5	1.367	493.150	35.225	528.375	490.696	35.050	525.746	7.189	1.592

The variation in the rate of gain was 26.4, 25.1, 27.3 and 50.9 percent, respectively, and that for the amount of feed required per unit of gain was 52.2, 17.8, 28.3 and 51.6 percent for the 50 to 100, the 100 to 200-, the 200 to 300- and the 300 to 400- pound intervals, respectively.

Table XVIII compares for each period the rate of gain and the feed requirement per unit of gain of the two pigs killed at the close of the periods with those of the pigs continued to the heavier weights. It also gives the average results for all the pigs carried through each period. With the exception of Pig 8 in choosing pigs to slaughter at the close of an interval care was taken to select representative pigs the rate and economy of whose gains were as nearly the average for the period as possible.

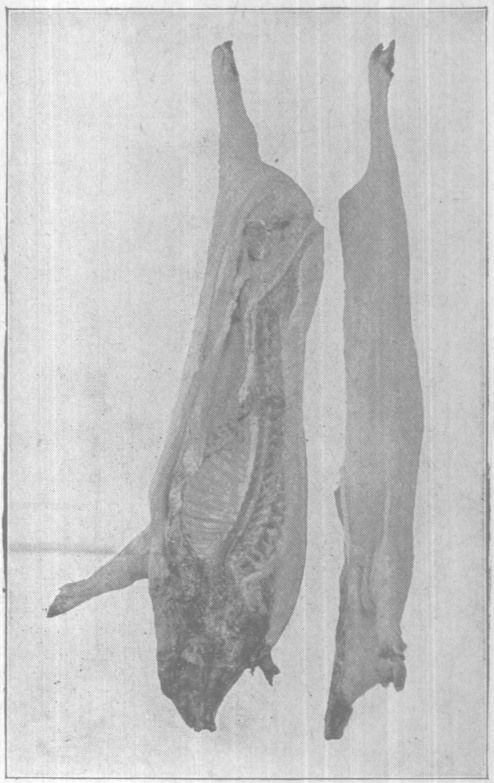


Carcass of representative pig killed at a weight of 100 pounds

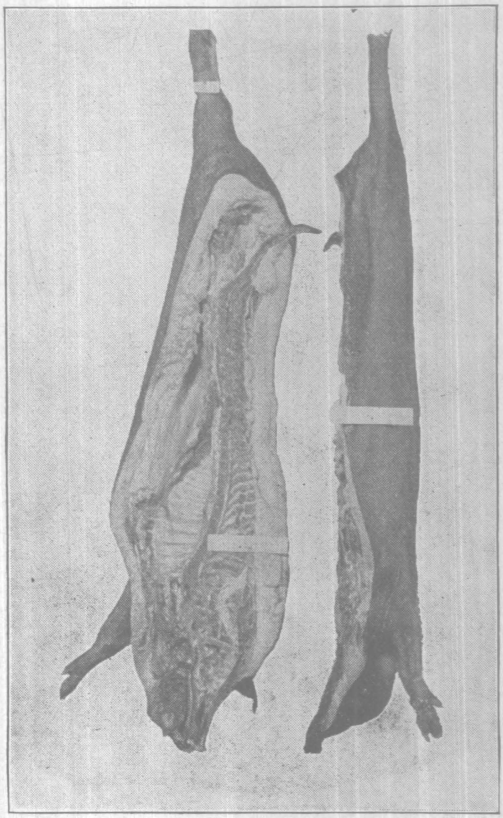
TABLE XVIII.—EXPERIMENT III: COMPARISON OF GAINS AND FEED REQUIREMENTS OF PIGS SLAUGHTERED AND THOSE CONTINUED TO THE HEAVIER WEIGHTS

	Average daily gain				
	50 to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Of 2 pigs killed at final weight	.853	1.685	2.225	1.259	1.367
Of those not killed	.889	1.628	1.905	1.697	.....
Of 12 pigs carried to 100 pounds	.882	.....	.....	.....	.....
Of 10 pigs carried to 200 pounds	.889	1.639	.....	.....	.....
Of 8 pigs carried to 300 pounds	.898	1.628	1.981	.....	.....
Of 6 pigs carried to 400 pounds	.857	1.631	1.905	1.535	.....
Of 2 pigs carried to 500 pounds	.897	1.714	2.113	1.752	1.367

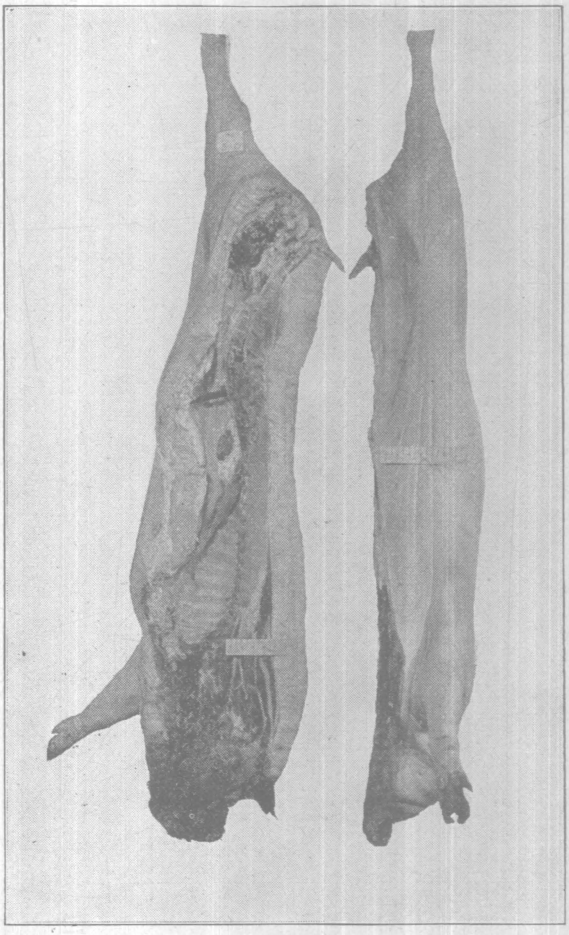
	Feed per 100 pounds gain				
	50 to 100 lbs.	100 to 200 lbs.	200 to 300 lbs.	300 to 400 lbs.	400 to 500 lbs.
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Of 2 pigs killed at final weight	313.483	330.758	341.605	597.292	525.746
Of those not killed	312.255	348.002	382.143	446.963	.....
Of 12 pigs carried to 100 pounds	312.479	.....	.....	.....	.....
Of 10 pigs carried to 200 pounds	312.255	344.660	.....	.....	.....
Of 8 pigs carried to 300 ponnds	316.297	348.002	371.377	.....	.....
Of 6 pigs carried to 400 pounds	333.732	343.900	382.143	492.517	.....
Of 2 pigs carried to 500 pounds	276.866	327.385	344.887	451.746	525.746



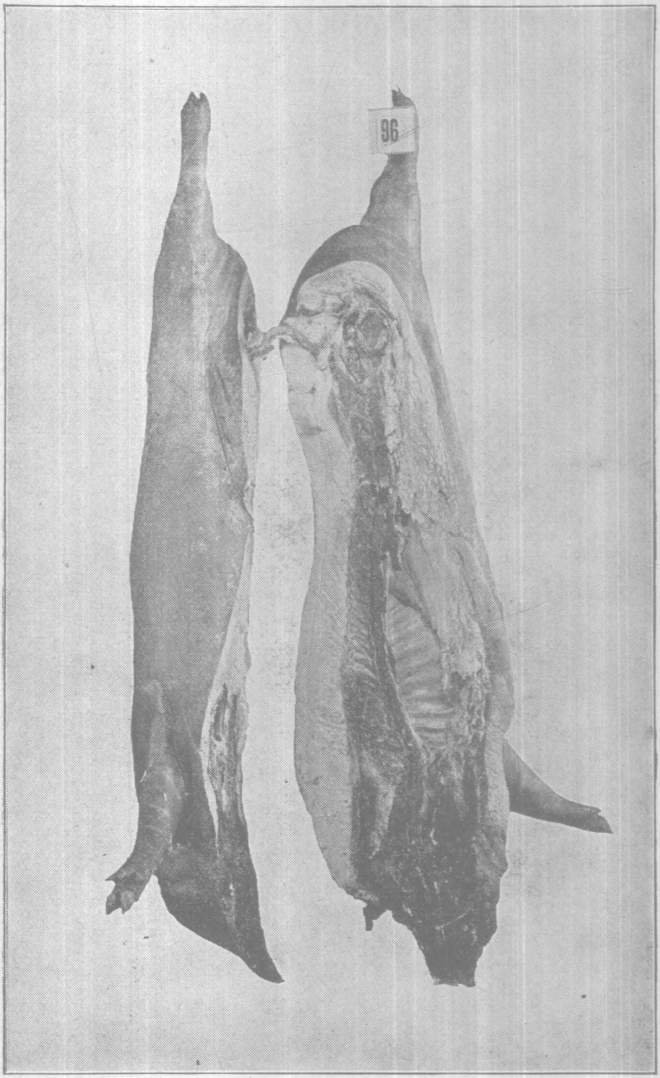
Carcass of representative pig killed at a weight of 200 pounds



Carcass of representative pig killed at a weight of 300 pounds



Carcass of representative pig killed at a weight of 400 pounds



Carcass of representative pig killed at a weight of 500 pounds

EXPERIMENTS IV AND V

Tables XIX and XX show the effect of finish, condition or degree of fatness on the rate of gain and the amount of feed required per unit of gain. In both experiments the pigs were on rape pasture. In the experiment reported in Table XIX a ration of middlings, 14 parts, tankage, 1 part, was first used. Hominy feed was later used in the place of the middlings. In the test the results of which was given in Table XX a ration of corn, 14 parts, tankage, 1 part, was fed. In each case Lot 1 was given a full feed of concentrates throughout the test.

Lot II was given approximately 2 pounds of concentrates daily per 100 pounds of live weight for the first third of the test and 3 pounds for the second third. For the last third of the test they were given a full feed of concentrates twice daily. The experiment reported in Table XIX was continued for 21 weeks. Since a limited amount of concentrates was fed the pigs of Lot 2 for the first 14 weeks, at the end of this time they were not as fat nor in as high condition as were the pigs of Lot 1. Although they were considerably lighter in weight at the beginning of the third period they gained more rapidly for the last 7 weeks than did the pigs that were full fed throughout the experiment. Their concentrate requirement per unit of gain was 13 percent lower than that of the pigs of Lot 1.

TABLE XIX.—EXPERIMENT IV: EFFECT OF CONDITION ON THE RATE AND ECONOMY OF GAINS

	First period June 26 to August 14		Second period August 14 to October 2		Third period October 2 to November 20	
	Lot 1 Full feed	Lot 2 Limited feed	Lot 1 Full feed	Lot 2 Limited feed	Lot 1 Full feed	Lot 2 Full feed
Concentrates daily per 100 lbs. wt....pounds	4.546	2.497	5.032	3.548	4.193	4.466
Initial weight per pig.....pounds	35.5	35.6	67.3	56.7	143.75	111.9
Average daily gain.....pounds	.648	.431	1.495	1.127	1.610	1.639
Daily concentrates per pig. ....pounds	2.337	1.152	5 310	2 991	7.681	6 790
Concentrates per 100 lbs. gain....pounds	360.063	267 583	355.189	265 471	477.179	414.346
Cost of concentrates per 100 lbs. gain..dollars..	7.22	5.36	7.46	5.57	10.02	8.70
Value of gains over value of feed and forage.....dollars	6.67	6.20	12.03	15.62	4.42	10.17

Hominy feed $40 per ton; middlings $36 per ton; tankage $70 per ton; pasture $24 per acre; hogs $12 per 100 pounds

As shown in Table XX like results were secured in a similar experiment which lasted for 15 weeks. In both tests during the time they were fed alike the thinner pigs gained more rapidly and consumed less feed per unit of gain.

TABLE XX.—EXPERIMENT V: EFFECT OF CONDITION ON RATE AND ECONOMY OF GAINS

	First period June 26 to July 31		Second period July 31 to September 4		Third period September 4 to October 9	
	Lot 1 Full feed	Lot 2 Limited feed	Lot 2 Full feed	Lot 2 Limited feed	Lot 1 Full feed	Lot 1 Full feed
Concentrates daily per 100 lbs. wt...pounds..	3.884	2.120	5.531	2.992	4.460	4.899
Initial weight per pig.....pounds..	39.875	40.583	72.312	63.667	116.143	98.083
Average daily gain .....pounds..	.927	.660	1.339	.983	1.610	1.705
Daily concentrates per pig.....pounds.	2.179	1.105	5.126	2.420	6.437	6.267
Concentrates per 100 lbs. gain.....pounds	235.067	167.523	382.701	246.102	399.747	367.598
Cost of concentrates per 100 lbs. gain.dollars..	4.94	3.52	8.04	5.17	8.39	7.72
Value of gains over value of feed and forage on basis of 6 pigs per lot.....dollars .	12.56	10.57	9.43	12.35	10.13	12.27

Corn $1.12 per bushel; tankage $70 per ton; pasture $24 per acre; hogs $12 per 100 pounds.

Table XXI shows in three periods of 6 weeks each the results of a dry-lot feeding experiment in which narrow, medium and wide rations of corn were used. The medium ration contained approximately one-half as much tankage as the narrow one and the wide ration one-half as much as the medium one. In all three rations the proportion of tankage to corn was decreased each week. For the first and second periods the pigs fed the most tankage made the most rapid gains and required the least feed per unit of incerase in live weight. For the third period, however, they gained more slowly and required more feed per unit of gain than those of either of the other two lots. For all three periods both the rate of gain and the feed requirement per unit of gain of the pigs fed the medium ration were intermediate. The results of the experiment indicate that the relative proportions of corn and tankage may exert an influence on the comparative rate and economy of gains at different weights.

TABLE XXI.—EXPERIMENT VI: INFLUENCE OF VARIOUS PROPORTIONS OF CORN AND TANKAGE ON THE RATE AND ECONOMY OF GAINS AT DIFFERENT WEIGHT

	First period January 8 to February 19			Second period February 19 to April 2			Third period April 2 to May 14		
	Lot 1	Lot 2	Lot 3	Lot 1	Lot 2	Lot 3	Lot 1	Lot 2	Lot 3
Ration	Narrow	Medium	Wide	Narrow	Medium	Wide	Narrow	Medium	Wide
Initial weight per pig....pounds..	46.9	46.9	47.8	86.6	82.1	80.4	150.125	141.125	145.125
Average daily gain....pounds..	.945	.838	.776	1.476	1.288	1.233	1.488	1.661	1.905
Daily feed per pig....pounds..	3.175	3.061	2.963	5.300	5.144	5.165	7.094	6.918	7.349
Feed per 100 lbs. gain: corn....pounds..	249.143	316.278	355.337	284.946	357.394	396.911	407.300	385.484	372.266
tankage....pounds..	86.751	48.921	26.411	74.065	41.922	21.892	69.440	31.111	13.562
tota....pounds..	335.894	365.199	381.748	359.011	399.316	418.803	476.740	416.595	385.828
Cost of feed per 100 lbs. gain....dollars..	8.02	8.04	8.03	8.29	8.62	8.70	10.58	8.80	7.92
Value of gains over value of feed....dollars..	7.90	6.97	6.47	11.50	9.16	8.46	4.45	11.16	16.32

Corn $1.12 per bushel; tankage $70 per ton; hogs $12 per 100 pounds.

SUMMARY

Thrift, previous treatment, and kind and quantity of feed and probably also the type, breeding and individuality of the pigs influence the relative rate and economy of gains at different weights.

The feed requirement per unit of gain increases as the pigs increase in weight.

The tendency is for the average daily gain per pig of full-fed pigs to be higher for each successive 100-pound interval until a weight of approximately 300 pounds is reached and to drop thereafter.

The daily feed consumption and the rate of gain, per 100 pounds of weight, decrease as the pigs increase in weight.

The dressing percentage of full-fed pigs increases until a weight of at least 400 pounds is reached. Because of this heavy hogs have a higher utility value per 100 pounds than lighter ones.

For the experiments in which the proportion of supplement was gradually reduced, the most profitable weight at which to market was heavier than that for the experiment in which a constant proportion of supplement was fed.

The weight at which it is most profitable to market pigs full fed from birth is influenced by the method of proportioning the supplemental feed, by the amount of supplement used and its relative price with that of corn or other carbonaceous feed, and by the relative price of feed and the market value of hogs.

PRICES OF CORN AND HOGS FOR TEN YEARS

	Corn		Hogs	
	Farm price per bushel December 1		Average price per cwt. for December	
	Ohio	United States	Cincinnati Packing fair to good	Chicago Mixed and packers
1917	$1.36	$1.283	$16.525	$16.625
1916	.90	.889	10.125	9.85
1915	.56	.575	6.75	6.425
1914	.61	.644	6.75	6.875
1913	.63	.691	7.85	7.725
1912	.45	.487	7.45	7.325
1911	.58	.618	6.175	6.000
1910	.46	.488	7.725	7.45
1909	.56	.596	8.375	8.20
1908	.63	.606	5.75	5.375
Ten year average	.674	.688	8.35	8.185
Ten year average, 1907-1916	.59	.61	.....	....

From reports of the Bureau of Crop Estimates, U. S. Department of Agriculture.

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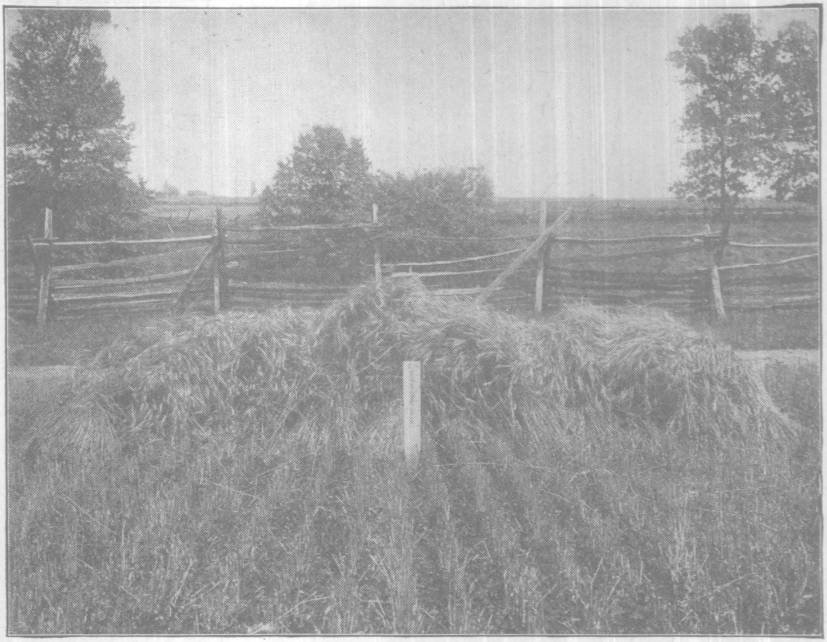

One hundred sixty pounds of acid phosphate per acre produced the difference in wheat yields harvested from these tenth-acre plots otherwise treated alike